



# **NAVAL POSTGRADUATE SCHOOL**

**MONTEREY, CALIFORNIA**

## **THESIS**

**SELECTION FOR CAREER COURSE AND IMPACT ON  
RETENTION OF BRAZILIAN AIR FORCE OFFICERS**

by

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March 2015

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**SELECTION FOR CAREER COURSE AND IMPACT ON RETENTION OF  
BRAZILIAN AIR FORCE OFFICERS**

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## **ABSTRACT**

This research examines the effect of a particular non-monetary incentive on the retention of active duty Brazilian Air Force colonels. The objective is to provide evidence to support the Brazilian Air Force Manpower decision makers in establishing policies regarding the selection of colonels for a career course. The characteristics of the incentives and the links to Expectancy Theory were reviewed to frame the hypotheses.

Using two sources of data from the Brazilian Air Force manpower databanks, logit regressions and descriptive statistics were analyzed to check the validity of the hypothesis and found overall that the selection of colonel for a career course (defined in Brazilian law as prerequisite for promotion) is strongly correlated with retention probability. Furthermore, the interaction between the selection for the course and the information the military receives from the performance appraisal system plays a significant role in retirement decisions.

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## LIST OF ACRONYMS AND ABBREVIATIONS

ACCP	Aviation Career Continuation Pay
CPEA	<i>Curso de Política e Estratégia Aeroespacial</i> (Course of Aerospace Policy and Strategy)
CPO	<i>Comissão de Promoções de Oficiais</i> (Officers Promotion Board)
DEPENS	<i>Departamento de Ensino</i> (Education Department)
DOD	Department of Defense
ECEMAR	<i>Escola de Comando e Estado Maior da Aeronáutica</i> (Air Force Command and Staff College)
FAB	<i>Força Aérea Brasileira</i> (Brazilian Air Force)
FY	fiscal year
LMR	<i>Lista de Mérito Relativo</i> (List of Relative Merit)
NMI	nonmonetary incentive
SIGPES	<i>Sistema de Gerenciamento de Pessoal</i> (Personnel Management System)
SISPROM	<i>Sistema de Promoções</i> (Promotions System)
TAPAS	Tailored Adaptive Personality Test

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## I. INTRODUCTION

All organizations to be successful need to manage four different types of assets: physical assets, financial assets, human assets, and intellectual properties. Although all are important, it is the human asset that will guide the others to the organization to achieve its goal (Mathis, Jackson, & Valentine, 2014). Similarly, the Força Aérea Brasileira (FAB) understands that the institution is composed of aircrafts, doctrines, buildings, equipment, and human resources, but recognizes, when establishing its values, that it is composed of “the men and women that ultimately were responsible for putting the institution in the current stage of development, as well as being responsible for deciding the future of the Air Force.”<sup>1</sup> The Air Force, however, faces problems related to shortage of staff in many different ranks and specializations. Among these, the retention of colonels deserves special attention for several reasons: (a) the problem (lack of personnel) is more grievous in this rank; (b) the organizational structure is arranged for several key functions to be exercised by these officers; and (c) from this pool of colonels, the leaders (general officers) of the FAB will be chosen in the near future. The present research examines the information available in the databases of FAB and determines whether the administration of a particular incentive (selection for career course) has been effective in increasing retention of colonels on active duty.

### A. BACKGROUND

To better understand the problem, which is discussed in the subsequent chapters, this section provides some basic concepts about the FAB’s organization. First, I present how the military career is structured based on the current legislation. Next, I discuss the *Curso de Política e Estratégia Aeroespaciais* (CPEA) and how it inserted itself into the context of career progression. I then review the problems that manpower decision-makers face in establishing policies regarding CPEA’s selection process. Finally, the section concludes with an overview of how the performance appraisal system and performance

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<sup>1</sup> Translated from the institutional site of Brazilian Air Force (available at [www.fab.mil.br/institucional](http://www.fab.mil.br/institucional)).

feedback work in that Air Force culture and how they might be playing a role in this context.

## 1. Career Flow

The career flow for the FAB's officers is governed by a series of laws and regulations observed in this study and briefly explained in Table 1. The way that the officer's career is structured contributes, to some extent, to the officer's attrition, which occurs mostly in the ranks of Lieutenant Colonel and Colonel, aggravating the problem of unfulfilled billets in the functions of O-6. According to Decree 8209, the FAB is manned with approximately 9,500 officers divided into 19 different specialties (Corps). Only five Corps have access to ranks of generalship and therefore are the focus of this research. They are aviators, engineers, infantries, stewardships, and physicians.

Table 1. Legislation that Governs Career Flow in the Brazilian Air Force

Constituição 05 Out 1988	Brazilian Federal Constitution (October 5, 1988)
Lei 6880 06 Dez 1980	Military Statute (December 6, 1980)
Lei 5821 10 Nov 1972	Promotions' Law for active duty officers in Brazilian Armed Forces (November 10, 1978)
Dec 7099 04 Feb 2010	Promotions' Regulation for Brazilian Air Force officers (February 14, 2010)
Port 92/GC3 14 Feb 2007	Establishes the prerequisites for promotion for officers in Brazilian Air Force (February 14, 2007)
MP 2215 31 Ago 2001	Military Pay Act (August 31, 2001)
Lei 11320 06 Jul 2006	Establishes the limits of manpower to be observed by the Brazilian Air Force (July 6, 2006)
Dec 8209 21 Mar 2014	Define the authorized billets in the current year according to rank and Corps (March 21, 2014)
TCA 37-3 13 Jan 2015	Tabulates the courses offered by the Department of Education (January 13, 2013)

The Military Pay Act stipulates that any military member may request retirement after completing 30 years of service. In that condition he is transferred to the reserves of that branch in the same rank as he held previously, receiving full compensation. Before

that, the military member has the right to leave active duty by quitting. In this case he is also transferred to the reserve of that branch in the last position he held, but he is not entitled to any pay compensation. In this case, for retirement purposes, he will be under the rules of the institution he decided to shift.

The Promotions' Law dictates that the officer shall to stay a minimum time at each rank to acquire a certain level of experience before being promoted, so that, although there are slight variations from person to person, the officer on average achieves the minimum expected time to retirement as an experienced O-5 to a recently promoted O-6. Therefore, policies to increase retention in the rank of colonel have required special attention from the human resources decision makers.

The Promotions' Regulation states that the institution should foster a regular and balanced career flow. For this sake, the Air Force High Command annually convenes to decide the promotion to the ranks of general officers. Ideally, colonels should remain in this position (O-6) for a period of five years, at which time the colonels are judged by the High Command and then should leave the rank either by promotion or retirement.

## **2. CPEA**

The CPEA, Course of Aerospace Policy and Strategy, is a course defined by the Ordinance 92/GC3 as a prerequisite for promotion to the rank of brigadier. The course is ministered by the Air Force Command and Staff College, Escola de Comando e Estado Maior da Aeronáutica (ECEMAR), located in the city of Rio de Janeiro. It is oriented for active duty colonels belonging to the Corps with access to generalship and its main purpose is to provide the knowledge applicable to the performance of higher-level functions in the Air Force.

The Air Force Department of Education, Departamento de Ensino da Aeronáutica (DEPENS), is the organism responsible to plan and execute the military education process regarding the graduation, post-graduation, and specialization phases. The CPEA is classified as a Course of High-Studies, which, according to the TCA 37-3, is defined as a modality of teaching that aims to qualify senior officers and similar civilians'

employees to exert functions that require specific knowledge, skills, and aptitudes proper of the Air Force high-management.

According to the DEPENDS, the CPEA provides students with learning experiences that enable them to:

- Contribute with the formulation and conduction of aerospace and national defense policies.
- Participate in the formulation and conduction of strategic-military and institutional planning in the Air Force.
- Plan institutional management systems in complex organizational contexts within the Air Force.
- Assess conjunctural factors and historic events, of general and military character, applicable to the performance of the highest-level functions in the Air Force.<sup>2</sup>

The course constitutes a workload of approximately 1,500 hours delivered over 41 weeks in a fully dedicated academic regimen, which when combined with the two months usually spent on the movements in and out, comprises approximately one year of absence from military, operational, and administrative activities.

### **3. The Problem**

As seen, the FAB faces problems related to lack of personnel and the point where the problem is more grievous (i.e., observed as many unfulfilled billets) is the rank of colonel as a result of the way in which the career flow is structured. In fact, the legislation provides the officers with the possibility to retire after completion of 30 years in service, which usually occurs between the last years of lieutenant colonel's service to the earliest years as colonel. This explains the natural increase of evading officers immediately after they reach this stage in their career.

One of the incentives for the colonel to remain on active duty after completing 30 years of service is undoubtedly the possibility of promotion to the rank of brigadier. This promotion is expected to be pursued by some officers since it carries great challenges and besides, obviously the status and benefits that come.

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<sup>2</sup> Translated from the TCA 37-3/2015 (available at [https://www.ciear.aer.mil.br/site/images/documentos/tca\\_37\\_3.pdf](https://www.ciear.aer.mil.br/site/images/documentos/tca_37_3.pdf)).

According to the Military Statute, the officers are divided in three distinct circles (junior officers, senior officers, and general officers). Therefore, the promotion to generalship constitutes a jump in the hierarchical structure. The importance given to this promotion is also clearly noticed in the Federal Constitution that determines a president's responsibility to nominate private positions and promote the general officers. Finally, even though the compensation differences could be considered not so vast (around 10% increase in basic pay) it is important to remember that the pay levels are maintained during the retirement. Considering that the CPEA is a legal prerequisite for the colonel run for promotion, the selection for that course should also be considered as an incentive.

Annually an internal organ called Comissão de Promoções de Oficiais (CPO), Officers Promotions Board, convenes to conduct the selection process of the Colonels for the CPEA. To foster the desirable regular and balanced career flow, the Board usually judges one cohort per year. The Promotions Board has the incumbency to discuss the job performance presented by the officers belonging to the cohort on the scope and select the colonels with the greatest merit to do the course, within the number of places stipulated by the Air Force Command.

The issue is that the organs that manage human resources in the FAB annually should dictate the number of vacancies to be filled by the CPEA for each cohort according to the interests of the Air Force. These numbers must be chosen within a range that varies between two extremes:

- The Promotions' Law establishes that the Air Force Command shall present to President of Republic a list containing a minimum number of colonels satisfying the prerequisites for promotion, regarding the number of billets to be fulfilled in the ranks of generals. So the projections of vacancies and attritions lead to the minimum number of colonels to be selected to the CPEA.
- The number of places cannot extrapolate the capacity dictated by the ECEMAR as a function of its infrastructure capacity.

The question surrounding this decision-making is that although the purpose of the course is to prepare officers for performance tasks as general officers, the institution cannot ignore the fact that the CPEA is an incentive that plays a significant role in an officer's retention.

Thus, the decision-maker faces the following dilemma: Choosing too many officers for the CPEA diverts too many colonels from administrative, operational, and military functions, so that colonels become exclusively devoted to academic activities for one year. Failure to select officers for the CPEA can generate demotivation and exacerbate the existing problem of retention.

Thus, according to Bardach (2012), after a problem is defined, the second step to analyze the best policy to adopted is to gather some data that could be turned into evidence; so within the uncertain environment, it would be possible in the future to conduct a sensitivity analysis of how each alternative might be desirable. In other words, for the human resources organs to be able to adopt policies aligned with the interests of the institution regarding the CPEA, they need to know with greater accuracy about the impact that selecting a colonel for the course has on his decision to anticipate his request for retirement.

Authorities responsible for managing human resources in FAB had already observed from data that the attrition rates of officers who fail to be selected for the CPEA is extremely high, which suggests that the incentive (selection for the CPEA) is extremely effective in retaining colonels. On the other hand, some manpower planners also noticed that the attrition rates of colonels who were selected for the CPEA is high as well. These advisers suspect that the performance feedback provided by the institution may be generating perceptions about promotion probabilities and therefore playing a significant role in the retention of colonels.

#### **4. Performance Feedback and Appraisal System**

To understand how performance feedback may be generating perceptions on promotion probabilities able to influence attrition rates, one must understand the performance appraisal system in the Brazilian Air Force.

According to the Officers' Promotion Board, military careers in the Air Force is meritocratic, so the higher ranks and positions of greater relevance are expected to be filled by qualified officers and with most merit. Then, annually, all officers are evaluated



by their superiors through standardized performance appraisal forms and evaluations of fitness.

To facilitate the job of the CPO in identifying the most deserving officers in comparison to their peers, the Board developed in 1990 its own methodology to quantify the merit of the officers. This methodology evaluates the results obtained from the official records of performance appraisals, fitness records, disciplinary sanctions, and results obtained in the career courses attributing points to each factor. Afterwards, these points are added by assigning specific weights to each factor. Once scored, officers belonging to the same cohort are ranked and for each cohort is generated a document called “Lista de Mérito Relativo” (LMR), List of Relative Merit, which according to the CPO is the basic tool for quantifying the merit of the officers.

Another aspect is that the Promotions’ Board believes that the primary goal of performance appraisal is to provide constructive feedback to the officer about his job performance in order to provide for the military better working conditions by identifying their deficiencies and improve future performance. Within this philosophy, the system begun to divide the cohorts into three groups of equal size according to scores in the LMR, and providing for the members information about which group the military belongs. The Figure 1 shows an example of how the officer observes his own performance when accessing his account on the site of the promotion system.

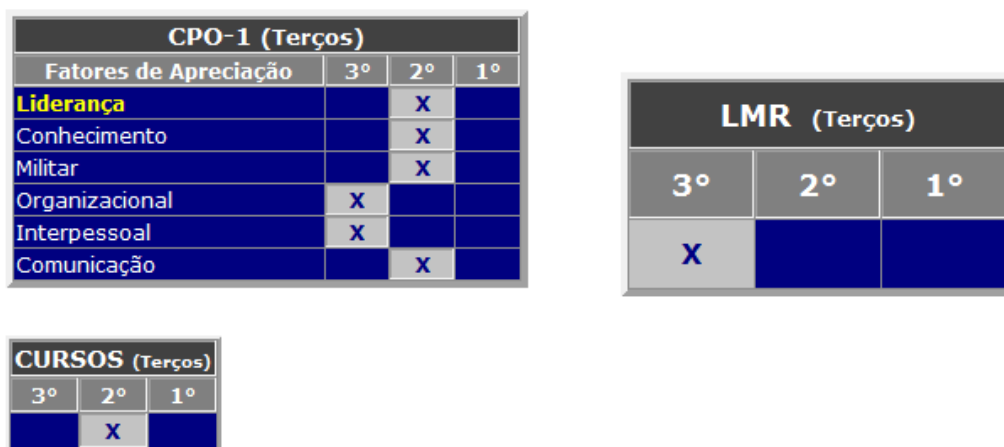


Figure 1. Performance Feedback

This information turns to be available for the cohorts graduating after 1982 and showed in terms of “Group of Merit” the general performance (right picture), specific performance (upper-left picture), and career courses performance (bottom-left picture).

For illustration, we can observe from Figure 1 how the system describes to the officers their performance. Let’s assume, for instance, that the feedback belongs to an officer whose cohort encompasses 90 members. Thus, in the factor *leadership* (*liderança*), first row in the upper-left picture, the score he achieved positioned him between the 31st and 60th position (what corresponds to Group 2 as checked in the box). Similarly, regarding the performance in career course (bottom-left picture), also positioned him in the same range. And finally, and most important in affecting perceptions, his overall ranking (right picture) placed him in a range that varies between the 61st and 90th position in the rank as compared with his peers (what corresponds to Group 3, as checked in the box, in the List of Relative Merit).

The argument presented by manpower advisors is quite reasonable. Since each group of merit encompasses one-third of the cohort and considering that the percentage of people selected for the CPEA (around 80% per cohort per year) and the proportion of colonels being promoted to the rank of brigadier (between 10% and 15% per cohort) is easily traceable; it is reasonable to expect that only a portion of people classified in Group 3 will not be selected to the CPEA as well as only a fraction of people who belong to Group 1 will get promoted. In other words, it is fair to believe that the performance feedback probably could be inducing perceptions about promotion probabilities and therefore driven the retirement decision of some colonels.

## **B. SCOPE AND METHODOLOGY**

This study retrieves and analyzes data from nine cohorts of the Brazilian Air Force (graduated between 1975 and 1983) belonging to the five Corps that have access to generalship. Descriptive statistics and econometric regressions are used to answer the research questions formulated in Section E of this chapter, that ultimately focuses on the effects that the selection for the CPEA generates in the retention of colonels in Brazilian Air Force.

### **C. PURPOSE**

As we have seen, every year the Promotions Board convenes to select to the CPEA the colonels who exhibited the best job performance throughout their career. Even though the Board has the incumbency to analyze performances, the choices are based on the numeric constraint dictated by the Personnel Headquarters. The main purpose of this study is identify to what extent the selection of a colonel to the CPEA contributes in the probabilities of retention in active duty in order to feed FAB authorities with a more accurate evidence to facilitate their role to establish policies regarding the CPEA's selection process.

As we have discussed, the FAB already noticed that the evasion of personnel that have not been selected to the CPEA is extremely high. The question is whether retention is a function of the CPEA's selection processes or other correlated factor such as rank in the LMR, as claimed by some manpower planners. In this sense the other aspect that deserves attention is whether the proposition that the disclosure of information about relative merit is actually inducing perceptions and effectively driven retirement decisions, perhaps diminishing the impact of the incentive; therefore, this study also aims to investigate this issue.

The analysis of the problem, controlling for both factors (selection for the CPEA and perceptions) can provide for the decision-makers a better understanding of the situation and consequently better conditions for establishing policies.

### **D. BENEFITS OF THE STUDY**

The Brazilian Air Force will be directly benefited by the results of the current study, once it provides more precise evidence about how the selection of a colonel for a career course as a nonmonetary incentive affects retention rates. Furthermore this study investigates what role perceptions (induced by disclosure of rank in the LMR) plays in this context.

There is no doubt about FAB concerns regarding the retention of officers. However, the purpose of the CPEA is clearly stated by the Education Department as to provide specific knowledge, skills, and aptitudes to perform tasks as generals; manpower

planners do not ignore that CPEA's selection affects retention rates. What is not so clear is how effective this incentive is and whether or not the perception induced by the LMR classification plays a role in this system.

Although, the issue is intriguing and important in the perspective of HR managers, no study was found within the Air Force University that specifically addresses the influence of CPEA's selection on colonels' retention. Investigating these questions will certainly fill a blank and leave the FAB better guided to act toward its institutional goals. Moreover, since incentives and perceptions involving senior employees are realities present in both military and civilian sectors all around the world, the findings provided in this study can be generalized and add value for academic and business knowledge, as well.

## **E. RESEARCH QUESTIONS**

To achieve its final goal this paper will pursue the following research questions:

### **1. Primary Questions:**

- What is the effect of being selected for the CPEA on retention of colonels?
- Is the effect of the CPEA different for colonels classified in different Groups of Merit?

### **2. Secondary Question:**

- Does the effect of being selected for the CPEA differ across Corps?

## **F. ORGANIZATION OF THE STUDY**

The current research is divided into five chapters. Chapter II presents the literature about organizational behavior and the existing academic knowledge, which addresses the problems discussed in this study: incentives, perceptions, and organizational culture. Chapters III and IV describe the data and methodology used to address the questions, as well as, the analysis of finding and results. Finally, Chapter V provides a brief synthesis of the study results and provides some suggestions about possible future studies and recommendations within the same theme.

## **II. LITERATURE REVIEW**

The main objective of this study is to analyze data from the Brazilian Air Force manpower databank and identify whether selection for the CPEA, as an incentive, influences retention rates of colonels belonging to the Corps and eligible for generalship. It is important to note that the CPEA was not intended to act as an incentive to motivate employees and reduce attrition rates. In fact, it is a course designed to improve human capital, delivering knowledge required to encourage the development of specific functions of the high-administration in the FAB. Indeed, promotions are broadly recognized as incentives, but the CPEA, as we have seen, is just a legal prerequisite for the promotion to the rank of brigadier. In other words, people that intend to be promoted have to take the CPEA, but whether the CPEA leads to the promotion deserves further discussion. Preliminary observation shows the results of the CPEA's selection process exert a heavy impact on attrition rates. Therefore, it may be plausible to assume that, at least for those that strive for promotion, the CPEA could be considered an incentive.

From a different perspective, as the internal regulation of Brazilian Air Force dictates, the selection for the CPEA is a merit-based process, and therefore the results of this selection in conjunction with some other meritocratic information, such as the performance feedback provided by the system, should be able to modify perceptions about career success. In such conditions, this information plays an instrumental role by pointing out whether a particular performance can lead to certain reward.

This chapter reviews past studies in the literature that address the characteristics of incentives in relation to organizational outcomes. I also review Vroom's Expectancy Theory and some past studies related to it, in order to understand the role of instrumentality in this context.

### **A. INCENTIVES**

As we have seen, the existing human resources within an organization are one of the most important assets that the institution needs to manage. Mathis et al. (2014) suggested that the successful management of human resources is strategic for the

organization. To survive in a competitive environment they should be able to respond quickly to the challenges or scenario changes, and many times the key for this quick response resides in the existing human capital the institution possess. Moreover, the strategic management of human resources is challenging by nature; since the human being, differently than other assets the organization should manage, has its own wishes. Thus, the organizations cannot stock their employees in shelves and believe they will be available at the moment they need. It is possible that employees get demotivated and switch to another company being unavailable in the critical moments.

As a result, in both public and private institutions, incentive packages have been designed to achieve or enhance the organizational goals. Different types of incentives have been used and have played an important role in enhancing performance and reducing attrition rates (Stitt, 2009). In organizations, these rewards normally come in the form of monetary incentives, such as pay, raises, health insurance, profit-sharing, and nonmonetary incentives like employment security, learning opportunities, praise, recognition, and status (Morrell, 2011).

## **1. Monetary Incentives**

### ***a. Monetary Incentives Are Effective***

Even though it sounds very intuitive that incentives lead to positive organizational outcomes, it is not as simple as one may assume. Providing more money to a worker does not necessarily lead to the desired outcome. Many empirical research studies have supported the effectiveness of monetary incentives, but a series of implications have been found as well. In fact, Chng, Rodgers, Shih, and Song (2012) stated that many researchers agree that incentive compensations are able to influence managerial behaviors and organizational outcomes, but the responses to the incentives are quite complex. Depending on the type of the incentive offered, sometimes the induced behavior takes a direction different than expected.

The study of Chng et al. (2012) used a simulation in part-time MBA students in a university in China and found that the behavior of employees in relation to compensation depends upon personal characteristics and situational factors. That means, the response to

a given incentive could vary from a person to another due the fact they have different characteristics or even vary from people with similar characteristics if they were in firms under different contingencies (growing or declining).

A study conducted by Lakhani (1988) investigated the effects of Regular Military Pay and Selective Reenlistment Bonus on quit rates of U.S. Army soldiers eligible for reenlistment, using data from the Defense Manpower Data Center. The empirical results of his research showed that both (basic pay and reenlistment bonus) had a negative correlation with quit rates; however, the Regular Military Compensation showed a higher elasticity than the enlistment bonus. The author noted that use of these bonuses has some advantages: it is easier to change periodically and across different occupations. Moreover, he also found that soldiers belonging to combat occupations were more responsive to the monetary incentive than those belonging to noncombat occupations. He suggests that this fact was justifiable since the human capital of soldiers with experience in noncombat occupations was more likely to be transferable to the civilian labor market. We can assume that that opportunity cost is an important factor to be considered in someone's decision regarding job opportunities.

Motivated by U.S. Department of Defense (DOD) budget constraints, Watson (2012) used data on the Navy's aviation community to assess how the retention of qualified officers belonging to that community would be affected if the Aviation Career Continuation Pay (ACCP) were altered or discontinued. The author adapted a logistic multiple regression model to predict the levels of retention for different levels of pay and found that the continuation of ACCP is essential to maintaining aviation officers. The predictions the model achieved under different results scenarios visually suggest that the response to the incentive is not linear. As the value of pay increases, the attractiveness increases as well, but at lower rates.

A study conducted by Ortiz (2014) used surveys to evaluate the preference of enlisted recruiters in the Navy for monetary and nonmonetary incentives. The results showed that these recruits were not very motivated by NMIs but the response for monetary incentive was very effective. Overall the results of the study suggest that even though some drawbacks would be expected, such as loss of cohesion and possible frauds,

the use of a small bonus per number of contracts per month rather than a fixed bonus would significantly improve the productivity of the recruiters. These results suggest this specific group is very sensitive to monetary rewards. They would improve effort to achieve targets if the reward were anchored in targets or would improve effort to achieve higher productivity if the reward system would be based in productivity. Cook (1988) also studied the behavior of enlisted Navy personnel responding to monetary incentives. In this case he investigated how nuclear-trained enlisted responded to pay raises in terms of retention. Similarly to Ortiz (2014), he found a positive correlation between the incentive and the outcome. However, in a contrary way, he observed a small elasticity. Previous research using different categories of people had discovered higher elasticities. In fact, Cook (1988) found the pay elasticity of nuclear occupations was 0.35, whereas the previous studies using other works found an elasticity around 2 to 3. This means that 1% increase in salary would be able to promote a 0.35% increase in retention of nuclear trained enlisted personnel or a 2% to 3% increase in retention in other occupations. Cook (1988) investigated the civilian market for similar occupations and found the civilian nuclear industry used to pay near the double in terms of salaries. According to the author, the big ratio between civilian/military pay and also the poor environmental conditions (these type of professionals are required to spend a considerable portion of their time on sea duty) help to explain the low elasticity.

***b. Use of Monetary Incentives Has Limitations***

Sorauren (2000) agreed with the economic proposition that the monetary incentives are able to motivate people to work. However, he also affirmed that the monetary incentive could not be the perfect motivator, due to the inherent conflict of interest generated between employers and employees as consequence of the fact that the material goods cannot be perfectly shared. When the object to be shared is knowledge, for example, employers can deliver it to their employees without losing anything; but when the object turns to money, it is impossible to increase the salaries of employees without losing profitability. Other authors display different points of view. For Kohn (1995), the rewards are not able to motivate people to work; instead they are only able to motivate people to work to get the reward, in other words, the reward can just foster a



temporary submission. Furthermore, Kohn (1995) stated that the reward undermines the intrinsic motivation, since it makes one believe if it is necessary to be “bribed” to work then the work should not be such a pleasant activity.

Bailey and Fessler (2011) studied the effects of monetary incentives regarding the variation of tasks in terms of attractiveness and complexity. In their experiment they decomposed the task in two different pieces: (1) initial performance and (2) rate of improvement. The authors figured that as the complexity of tasks increases, knowledge and skills should increase as well to foster a change in performance. Indeed, in order to get the reward one could improve effort levels, but it would be impossible for anyone to improve (at least in the short run) his or her levels of skills and knowledge. In this sense, according to Bonner et al. (as cited in Bailey and Fessler, 2011), increase in complexity is less sensitive to monetary rewards. The other point Bailey and Fessler (2011) defended was that as the task increase in attractiveness, it is more likely to induce intrinsic motivation and therefore the effectiveness of monetary incentives would tend to diminish (Ryan & Deci, 2000). The authors found, as they predicted, that monetary incentives are more effective when tasks are simultaneously less complex and unattractive. Moreover, the monetary incentive is ineffective to produce “learn” (increase in rate of improvement).

## **2. Nonmonetary Incentives (NMIs)**

### ***a. Incentives Are Complex***

The use of nonmonetary incentives has been extensively studied as well. In periods of budget constraints, they could be a possible alternative to handle the challenges of managing the talents with scarce resources. Coughlan, Gates, and Myung (2013), studying more specifically the nonmonetary incentives, affirmed that the use of NMIs could be cost effective when the value the people attribute to them are lower than the cost for the employer. They stated that the monetary compensation will begin to diminish at some point and after this point the effect of nonmonetary incentives is supposed to gain relatively more importance. In fact, the law of diminishing returns, as applied to pay, suggests, “while more pay will be more attractive, the rate of increase in

attractiveness will be less than the rate of increase in pay” (Worley, Bowen, & Lawler, 1992, p. 561).

To verify the diminishing returns principle, Worley et al. (1992) conducted empirical research among sales personnel geographically dispersed and belonging to an appliance manufacturer company in United States and supported the hypothesis that the relationship between the size of pay and attractiveness of pay was curvilinear with a significant and negative quadratic term.

Based on the literature review above, many empirical studies support the effectiveness of monetary incentives to foster desirable organizational outcomes, but many other factors make them quite complex. Similarly the NMIs have also been vastly studied and proven to motivate people toward desirable outcomes. Coughlan et al. (2013) tried to build a package of nonmonetary incentives that could be cost effective in addressing the needs of the DOD to reduce expenses while maintaining the ability to retain the high-level militaries to convey the missions the U.S. government is committed to. The authors concluded that overall the members valued some types of NMIs and stated that the use of these incentives (when the member valued it more than it cost to the government) is cost effective. However, they also found that to choose a package of incentives that could satisfy the majority of the personnel would be overwhelmingly complex. They found the existence of at least three sources of variability regarding preferences of members in the administration of NMIs: (1) variability across population classes or communities; (2) variability across individuals; and (3) variability across different NMIs packages. That means: (1) people with similar characteristics value a determined incentive more than other people with different characteristics. For example, if one divided a determined population in two different classes: unmarried and married, it is possible that the married people would value certain incentives, such as daycare more than the singles would because the married group is more likely to have children and need the service; (2) individuals within the same group could also present a particular preference for some incentives different than others. Using the same example from above, since there are spouses that are employed in the labor market while others are homemakers, the value of daycare would be different for the two different married

employees (even if both are parents). Finally, (3) trying to combine two or more incentives makes the issue even more problematic because the effect of combining more than one incentive is not simply additive, since some people consider the incentives complementary, while others consider the incentives substitutes and some might perceive them as totally independent.

***b. Individuals Respond Differently to Incentives***

Corroborating with the assertion of Coughlan et al. (2013) about individuals differences in responsiveness to incentives, Pema, Mehay, and Tick (n.d.) examined the role of personality traits in job decisions for the U.S. Navy. The authors used the Tailored Adaptive Personality Test (TAPAS), which is a test developed by the Army to assess the big five personality traits. Using datasets from the Navy Recruiting Command and Defense Manpower Data Center, they evaluated whether personality can affect enlistment decisions in American youth and found that some personality traits were predictive of enlistment decisions and therefore should be used in the screening and recruiting processes. In an earlier study, DeMatteo and Eby (1997) also studied individual differences and responses to incentives. They examined, in a field study, the relationship between some individual characteristics like orientation to work in teams and self-perception of ability in the acceptance to team-rewards and found that these characteristics influence the valorization each individual gives to this type of incentive (in terms of satisfaction and turnover intentions).

***c. Senior Employees Respond Better to NMIs***

Also aligned with the proposition of Coughlan et al. (2013) about variability of incentives across populations classes, Pink (2009) affirmed that a research conducted at the Massachusetts Institute of Technology showed that the monetary incentives are effective in increasing performance of employees in mechanical tasks. However, when it turns to tasks that require more complex skills, such as creativity, innovation or higher level of cognitive domain, the nonmonetary incentives, after satisfying the basic needs, are more effective. It is true that complex skills are not necessarily related to seniority,

but considering managerial positions or Armed Forces senior officers, we can fairly assume that the NMIs are likely to be more effective.

A research conducted by Takahashi (2006) leads to some similar conclusions with slight differences. For him, the observations of basic needs are important and also the effect of NMIs appears to be more effective in senior employees than junior ones. It is important to highlight that the Japanese culture is very oriented toward seniority. That means, rarely does a junior employee take over a senior one, independent of the skills he possesses. Moreover, the companies' structures used to be very flat, and managerial positions are few. So, to maintain a high level of motivation, organizations raise wages based on development of skills. This means that wages are not strictly related to ranks or positions. These cultural practices help to explain why senior employees are more sensitive to promotion than junior ones and why junior employees respond better to salaries. However, the author found that overall both, monetary and nonmonetary incentives are meaningful for both classes.

Takahashi (2006) assessed the effects of monetary and nonmonetary incentives in employees belonging to a group of companies from the automotive sector in the Japanese market. He distributed surveys for white-collar and blue-collar workers of units from Toyota Motors in Japan. The survey aimed to investigate and understand the effects of two different incentives (promotion and wage) in the motivation of workers and concluded that both incentives exerted a strong influence on the employees' motivation to work hard. The study showed that in both groups, white-collar and blue-collar workers, the fair promotion presented a higher effect in motivating people to work hard than wages did, but the white-collar ones strongly valued the development opportunities. The study also discovered that the salary level and the experience of receiving an increase in salary also had an important effect in enhancing employees' motivation, particularly for the younger employees that valued the wages more than the promotion.

***d. Different Cultures Respond Differently to Incentives***

One other important point to address is, independent of the incentive being monetary or nonmonetary, the cultural background may change the response to the

incentive. The study of Gretzinger, Matiaske, Lemke, and Piske (2014) analyzed a multinational company with 14,000 employees spread over 32 different countries and aimed to verify whether cultural differences affected the incentive reward system response in relation to turnover rates. The findings showed yes. Overall, a merit-based award system proved more efficient in individualistic cultures than collectivistic ones, and monetary-based incentives around social security proved better for cultures that are more risk averse. In this way, the authors concluded that if the goals are to enhance commitment levels or reduce turnover rates the company should be able to adapt the human resources management practices to the background culture. The key is that understanding the employee's needs is critical to conquering his or her commitment and loyalty.

*e. Basic Needs Should Be Addressed First*

The earliest motivational theories were born in the 1950s (Robbins & Judge, 2012), and undoubtedly Maslow and his Need Hierarchy Theory were the simple and widely discussed theory in the field of motivation (Aswathappa & Reddy, 2009). In Maslow's concept the factors that produce motivation could be classified in five different levels (Self-Actualization, Esteem, Social, Safety, and Physiological) and arranged in a hierarchical pyramid, so that the needs of lower order (physiological) should be met first, that is, the person's concerns about some needs advance to the next level only after satisfied (or at least minimally satisfied) the needs of prior level. Also, according to Aswathappa & Reddy (2009), salary and basic work conditions, in the organizational context, are classified as physiological needs. After Maslow, the Two-Factor Theory of Work Motivation published by Herzberg in 1959 enhanced this concept. This theory, also known as Theory of Hygiene Factors, stated that only some factors were able to provoke motivation, whereas other factors could only avoid dissatisfaction; in this way, they should be measured under two different continuums (Stello, 2011). Although very important, for having been the theoretical foundations from where many other theories have grown, these early theories have been the target of criticism and questioned in terms of validity (Robbins & Judge, 2012). Nonetheless, many studies on the effect of NMIs have shown, as the early theories stated, that basic needs should be observed. Appelbaum

& Kamal (2000), for instance, investigated the effectiveness of the nonfinancial incentives in small business (firms with less than 100 employees) in Canada. They distributed surveys to employees of 45 firms and concluded that many different nonmonetary incentives were effective in increasing firms' attractiveness like recognition, job enrichment, internal pay equity and managerial skill. They also found that the use of these incentives should not be random but based on specific needs of the employees for each specific firm and that the combination of NMIs had a synergistic effect. Furthermore, aligned with the motivational theories, the study clearly found that income is essential in the package of incentives to provide, at least the basic physiological and security needs in a way to optimize the employee efficiency, regarding the improvement of productivity, reduction of absenteeism and turnover rates.

Actually the results of the study of Appelbaum and Kamal (2000) were initially contradictory. The authors mixed quantitative and qualitative approaches in their research, and while data showed that employees valued NMIs, they were clear in affirming "nothing other pay would serve to dissuade a move." (p. 753). Further investigation led Appelbaum and Kamal (2000) to the fact that household income was a moderating variable in determining the effectiveness of job recognition. The authors stated, therefore, that it was easily understandable that people facing financial troubles might have difficulties valuing the nonmonetary incentives.

Pinto (2011) also studied the effects of nonmonetary incentives in an industrial company in Portugal and used a mix of quantitative and qualitative approaches (document collection, surveys, interviews, and focus groups). He found that the Department of Human Resources in that company understood that the NMIs should be part of compensation package but it could not be a substitute of monetary ones, since it would generate dissatisfaction. For the HR department, the NMIs should be complementary and integrated to a system of rewards. In the same line, Pinto (2011) figured out that the employees valued the NMIs, but they were afraid that this compensation could be a substitute for the cash incentives. The work overall concluded that NMIs are important and valued by employees and recognized as so by the company, but the primary necessities could not be neglected. The author also stated that his work

found support in Herzberg's Two Factors Theory and affirmed that employees adhered to the statement that factors that cause motivation are different from factors that cause satisfaction. As the Two-Factors Theory suggests, salary is a hygienic factor: although it cannot produce satisfaction, it is necessary to avoid dissatisfaction.

## **B. EXPECTANCY THEORY**

As discussed in the previous chapter, the attendance to the CPEA is clearly stated in the current FAB's legislation as a prerequisite for promotion. Not being selected for the course, therefore, extinguishes any chance of promotion. However, the selection for the course, even though necessary, is not sufficient to guarantee promotion, since the number of vacancies in the functions of generalship to be fulfilled each year is always smaller than the number of colonels graduated in the ECEMAR.

Having reviewed the varying influence of incentives on motivation, this section utilizes Expectancy Theory to develop hypotheses that help explain variance in the effect of the CPEA as a retention tool for the Brazilian Air Force. Moreover it is important to address the concerns about the role played by the performance feedback that all Air Force officers receive from the system in terms of classification in the List of Relative Merit. As seen in Chapter I, all officers are divided in three tiers that FAB calls Group of Merit, and they are informed about the group they belong to. For this sake, manpower planners in the Air Force believe this information affects perceptions about chances of promotion and therefore plays a significant role in retention of colonels.

Ultimately, this study aims to contribute to the literature by investigating how a specific population (Brazilian Air Force colonels) responds to a determined nonmonetary incentive and how the flow of information related to performance is able to modify perceptions and influence the strength of the NMI in fostering desirable organizational outcomes.

The Expectancy Theory developed by Victor Vroom is currently one of the most widely recognized motivational theories (Robbins & Judge, 2012). The theory basically aims to understand whether employees are motivated to put an extra level of effort to achieve a determined reward.

Figure 2 shows that an increase in individual effort leads to an increase in performance, and by the turn, this increase in performance level may lead to a determined reward that may or may not be aligned with personal goals.



Figure 2. Expectancy Theory. Source: Slideshare at <http://www.slideshare.net/leng81287/robbins-eob9-instppt05>.

In this reasoning, there are three important relationships in this system: (1) Effort–Performance (expectancy); (2) Performance–Reward (instrumentality); and (3) Reward–Personal Goals (valence).

The three links could be defines as:

- “Expectancy is the perceived probability that effort will lead to good performance” (Abadi et al., 2011).
- “Instrumentality is the perceived probability that good performance will lead to desired outcomes” (Abadi et al., 2011).
- “Valence refers the value the individual personally places on rewards” (Abadi et al., 2011).

Vroom’s theory states that the strength that moves someone to a determined choice depends on a product of three factors, which refers to the three relationships afore mentioned.

$$F = E \times I \times V \quad (1)$$

In Equation 1, F is the motivational force that pushes someone to move toward a determined direction. E is the **expectancy** or the perception that an extra effort will lead to an increase in performance. I is the **instrumentality** or the belief that determined level



of performance can lead to the reward. V is the **valence** or the importance that the individual in scope gives to that reward.

To support expectancy theory, various empirical research have been conducted. According to Salanova et al. (1996) (as cited in Regis & Calado, 2001) the Vroom model aims to predict individual decisions. In this sense, some studies built models to predict, based on the expectancy theory, the behavior of some employees.

De Oliveira, Madruga, and Pontes (2013), for instance, developed a model to predict the willingness of employees belonging to Banco do Brasil to participate in a corporate volunteering program based on expectancy theory. His methodology basically replied, with the necessary adjustments to fit in the context of that culture, the previous studies of Parker and Dyer (1975) and Allen, Lucero, and Van Norman (1997). They distributed surveys and focused on the variables related to valence, instrumentality, and expectancy to predict, based on a formula similar to that showed in Equation 1, how inclined each particular employee was to participate in a determined program. Attributing points to the answers, they scored each of the three variables (valence, instrumentality, expectancy) and determined the motivational force to participate, and motivational force to not participate in the program. Those whose scores to “participate” were higher than “not participate” were supposed to be volunteers in the program, since, according to Abadi, Jalilvand, Sharif, Salimi, and Khanzadeh (2011), individuals are expected to choose between the options (participate or not participate) the one that provides the greatest motivational force. And finally crossing the information of those who declared willingness to participate with the results of motivational forces, one can figure the reliability of the model.

Summarizing the purpose of this study is to investigate the ability the selection for the CPEA has in promoting retention. As we viewed, NMIs are expected to foster positive organizational outcomes, especially for senior employees; but also, due to the complexity of incentives, variations are expected across different groups of people and across different individuals. The expectancy theory explains these variations. Assuming that different individuals have different valence (desire to achieve the promotion to generalship) and different groups of people (in terms of Group of Merit) can nurture

different perceptions about instrumentality (chances to get promoted after being selected for the CPEA) it is possible to make some important inferences.

### **1. CPEA and Instrumentality**

My first point refers to instrumentality. According Robbins and Judge (2012), instrumentality is “the degree the individual believes performing at a particular level will lead to the attainment of a desired outcome” (p. 86). As we have mentioned, the selection for a career course is defined in internal Air Force regulation as a function of merit (good performance). Moreover, it is clear in the law that the CPEA is a prerequisite for promotion. So, there is no doubt for those that belong to that system that lose the chance to attend the course will vanish any possibility of promotion. Thus, it is a break in instrumentality, what this means is that the performance presented by that specific colonel was not enough to lead him for the promotion in scope.

Further, I am assuming that a selection for the CPEA is an incentive, regarding the obvious fact that it keeps the military in the “run” for promotion and also is a recognition of good services and a career development opportunity as well. Since incentives are supposed to lead to positive outcomes, recalling the statements of Pink (2009) and findings of Takahashi (2006) that lead us to believe that senior employees are likely to have a good response to NMIs, I suggest that:

**H1) the selection for the CPEA will increase retention rates.**

### **2. Performance Feedback and Expectancy**

The second point I want to address is about expectancy. According to Robbins and Judge (2012) *expectancy* is “the probability perceived by the individual that exerting a given amount of effort will lead to performance” (p. 86). As we stated, FAB started to deliver for the officers graduated after 1982 the information about the Group of Merit they belong and according to some manpower planners, this information possibly is interfering in the decision of colonels to anticipate their retirement. As a matter of fact, this information reflects somehow (quantitatively) the official records about around 30

years of past performance. In this situation, if the colonel believes it would be extremely difficult to increase the effort to a certain level that could change an unfavorable position in terms of performance in the remaining four or five years, then there is a break in expectancy that theoretically justifies a premature request of retirement.

**H2) colonels belonging to Group 1 will respond better to the incentive  
(selection for the CPEA) compared to Groups 2 and 3.**

**3. Promotion and Valence**

One last point in the expectancy theory that should be commented concerns the valence (whether the offered incentive matches with the personal goals). Our reasoning, up to this point, was based on the assumption that the colonel aims for the promotion, what might not be true in some cases. As Coughlan et al. (2013) suggested, the value a determined person gives to a determined incentive will depend on the person and also on the incentive. Chances are that some people really enjoy the activity or at least the status that comes with the rank of colonel or the functions linked to that rank. If that is true, the promotion probably would be an extra incentive since the functions and prestige associated to the rank of general would be even higher. But, since these people grew in their career knowing that the chances to ascend beyond the rank of O-6 is low, it is possible that some colonels will not get frustrated by not being promoted or receiving some information that leads him to the belief that promotion is unlikely. A study in South Africa conducted by Visagie and Koekemoer (2014) argues that formerly career success was defined as pay raises and vertical ascensions, mainly for employees in management positions such as senior managers. But what the authors found in their study was that pay and promotions are not all that managers strive in their careers. There are some different objectives to be pursued that vary from people to people and change in the same people as they grow in maturity. In fact, there are a number of objectives people aim to achieve to feel fulfilled and contented with the job, like personal growth, development of functions in leadership, exceeding personal and organizational goals, adding value for organization, receiving feedback and recognition, just to name a few. In the same

reasoning, it is fair to believe that some officers do not care that much about the promotion (prioritizing life balance or other opportunities outside the military) and even being selected for the CPEA will ask retirement prior to completing the five years in rank.

These statements are very aligned to the findings of some authors that affirmed incentives are complex and vary from one person to another. Though, it does make sense to assume that different people have different goals and therefore the value of a given incentive surely would depend on whether the incentive matches the goal.

**H3) of those in the highest group of merit, there will still be variance  
in the retention rates due to different values.**

Beyond the field of expectancy theory, there is one last point mentioned in this study that should be addressed since it is relevant for decision-makers when analyzing alternatives to establish policies regarding the CPEA. Officers belonging to different Corps are under the same legislation, but the policies that govern career flow can be different to support the different needs of the institution. The issue concerns the possible difference that the Corps could present in relation to the incentive. Three different perspectives converging to the same conclusion have been mentioned in this paper. Coughlan et al. (2013) supported that it is expected variability across different population classes; Gretzinger et al. (2014) remembered that when the objective is to improve employees' motivation the background culture should be observed; and Lakhani (1988) found that opportunity cost plays an important role in job decisions. As we have told, officers belonging for five different specializations are eligible for promotions to the ranks of generalship and therefore are in the scope of this research. Although they are very similar to some sense (all are colonels of the Brazilian Air Force), since they belong to different Corps they could be considered belonging to different subcultures. In fact those colonels were graduated from different schools, normally spent their careers in different organizations and report to different headquarters. Furthermore, although all of them exist to support the same institution, their specific goals are very different. They dress in different uniforms for their daily routine due to the specificity of each function,

cluster in groups with similar background and use a “language” (colloquial and technical) that, for those who do not belong to the group, requires “translation” to fully understand the content. And finally, regarding the opportunity cost, the demand for their human capital in the civilian labor market is remarkably different. For instance, the Brazilian government is currently creating agreements to facilitate the entry of physicians from other countries into the Brazilian public health system, whereas the hiring of foreign pilots is still forbidden for national aviation companies. Moreover the chances of career success, regarding the probabilities to get promoted or assume relevant functions inside the Brazilian Force are also fairly different.

A brief glance at Decree 8209, which currently dictates the billets for the Brazilian Air Force, for the fiscal year 2014 gives a clear notion about this issue. The document authorizes the FAB to be manned with 2,500 aviators and 2,868 officers belonging the other four Corps altogether. However, due to the specificities of the functions related to the higher administration, the aviators are privileged when considering the chances to ascend in the career. While 64 functions for generals are reserved for aviators, only 17 are reserved for the other four specialties altogether. Table 2 shows more precisely the total number of officers and generals per specialization authorized for the fiscal year 2014. Moreover, the promotion for highest rank in the career, that leads to the functions in the Air Force High Command are exclusively reserved for aviators.

Table 2. Distribution of officers in Brazilian Air Force for FY 2014<sup>3</sup>

DISTRIBUTION OF OFFICERS FOR 2014					
CORPS	GENERALS			TOTAL GENERALS	TOTAL OFFICERS
	O-9	O-8	O-7		
<b>QOAV (AVIATOR)</b>	<b>8</b>	<b>21</b>	<b>35</b>	<b>64</b>	<b>2,500</b>
<b>QOENG (ENGINEER)</b>	-	1	5	6	557
<b>QOINT (STEWARDSHIP)</b>	-	2	6	8	954
<b>QOMED (PHYSICIAN)</b>	-	1	5	6	957
QODENT	-	-	-	-	357
QOFARM	-	-	-	-	165
<b>QOINF (INFANTRY)</b>	-	-	1	1	399
QOEsp	-	-	-	-	967
QOEA	-	-	-	-	1,455
<b>SUBTOTAL</b>	<b>8</b>	<b>25</b>	<b>52</b>	<b>85</b>	<b>8,311</b>

Once the colonels belonging to the five different Corps are supposed to belong to different subcultures and have different opportunity costs, regarding the chances they have inside the Air Force and in the civilian labor market, it is fair to believe that individuals belonging to different Corps will respond differently to the same incentive. Therefore, I adhere to the findings of Coughlan et al. (2013), Lakhani (1988), and Gretzinger et al. (2014) and, based on the proportions showed in Table 1, hypothesize that:

**H4) Aviators will present a better response to the CPEA's selection in terms of retention.**

<sup>3</sup> Data extracted from the Decree 8209/2014 available at [http://www.planalto.gov.br/CCIVIL\\_03/\\_Ato2011-2014/2014/Decreto/D8209.htm](http://www.planalto.gov.br/CCIVIL_03/_Ato2011-2014/2014/Decreto/D8209.htm).

### **III. DATA DESCRIPTION AND MODELS SPECIFICATION**

#### **A. DATA DESCRIPTION**

This study retrieves data from the Brazilian Air Force manpower databanks to analyze how colonels behave in terms of retention in response to selection for the CPEA.

The data came from two sources:

1. Sistema de Gerenciamento de Pessoal (SIGPES). The Personnel Management System is managed by the Personnel Headquarters and provided data with demographic information such as rank, specialty, date of birth, marital status, number of dependents, race, religion, and date of inactivity.
2. Sistema de Promoções (SISPROM). The Officers Promotion Board manages the Promotions' System. The data provided meritocratic information such as the punctuation in List of Relative Merit, the tier (Group of Merit) in which each officer was classified, dates of promotions, and whether or not each officer had been selected to be enrolled in the CPEA.

The original data includes nine different cohorts of officers educated in one of the Brazilian Air Force training schools (graduated between the years 1975 and 1983) who belong to the five Corps with access to positions of general officers (aviators, stewardships, infantry, engineers, and physicians). After merged, the remaining file generated records pertaining to 1,927 people (equivalent to entire population of the mentioned cohorts).

From that 1,927 people whose data referred, 1,036 reached the rank of colonel. After deleting data with missing or inconsistent information, records relating to 1,021 colonels were used in the logit regressions.

Figure 3 depicts the size of cohorts and proportions that the Brazilian Air Force has applied regarding the CPEA's selection process. The selection is conducted in the Promotion Board, but the process observes the guidance of the Air Force Chief of Staff Office that annually coordinates the vacancies for the course regarding the constraints of the Command and Staff College, and the manpower needs as directed by the Personnel Headquarters.

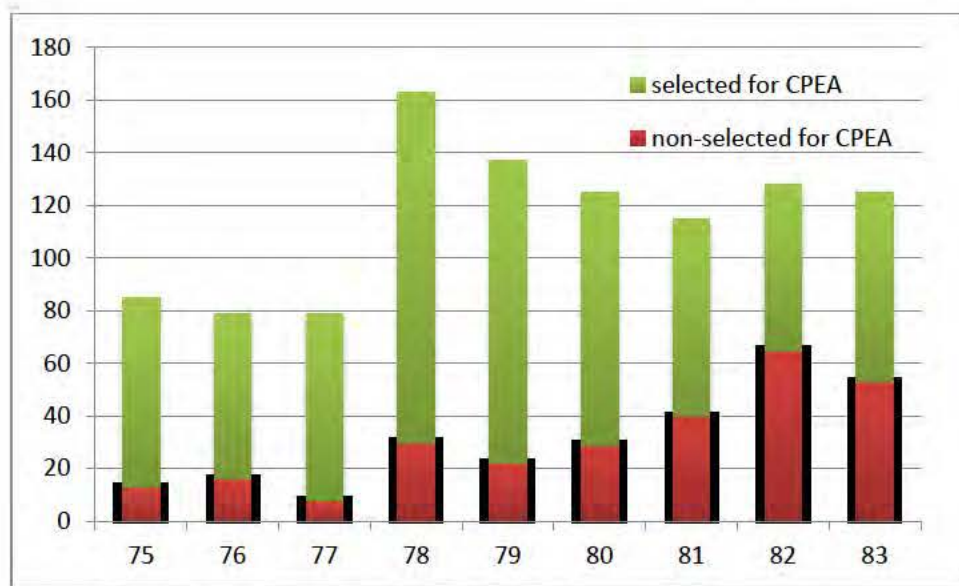


Figure 3. Selection for the CPEA across Cohorts

Figure 4 shows how the colonels are divided in terms of specializations, which ultimately reflects the proportion of colonels existing in the Air Force distributed across these five different Corps.

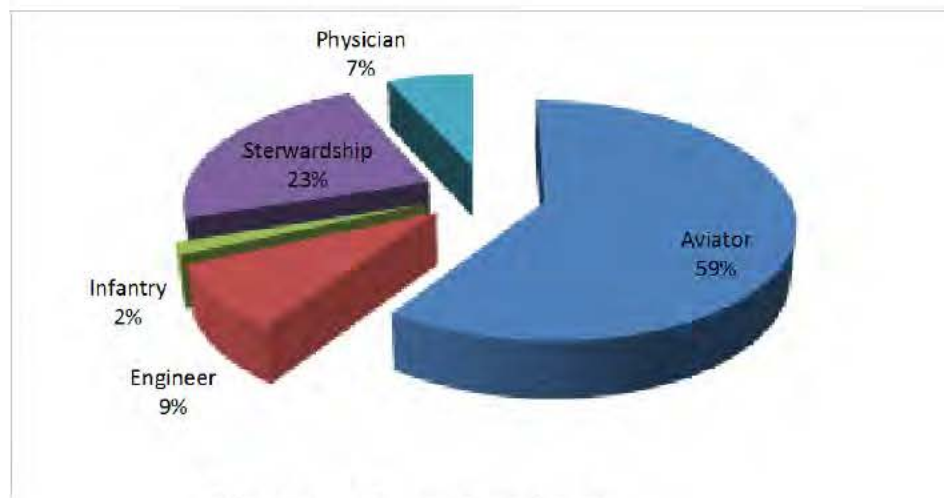


Figure 4. Proportion of Corps

Although the number of people is vastly different as showed in Figure 4, the selection process logically takes the size of the Corps into consideration, since the functions to be occupied, both in the rank of O-6 as in the rank O-7, are built to be



fulfilled by a determined specialization. Figure 5 shows the proportions of colonels selected for the course across the different Corps.

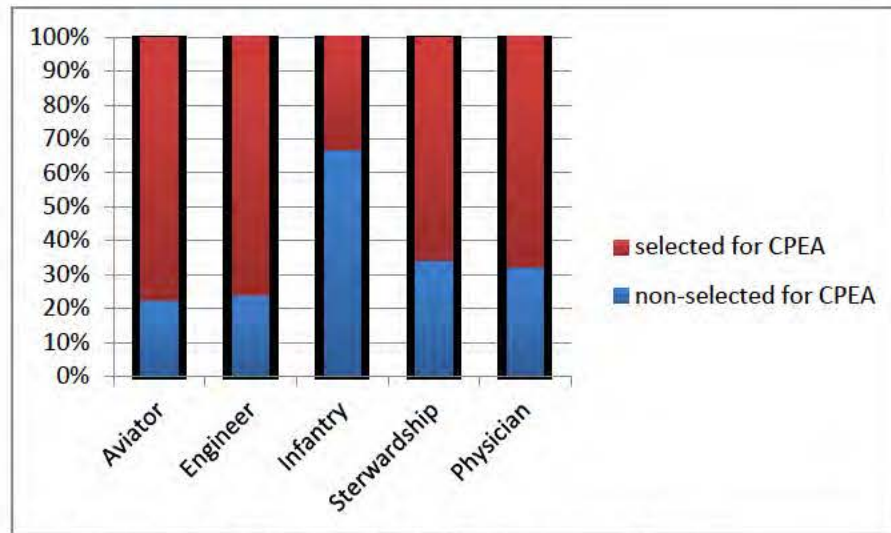


Figure 5. Selection for the CPEA across Corps

As it is salient, the infantry has an index of CPEA selection that is much smaller than the other Corps. Actually, the first function for brigadier infantry was created in 2008, explaining the lower selection rate for that specific Corps (infantry) and reflecting the transitory period of policies adjustment.

## 1. Dependent Variable

### a. Retention

The dependent variable considered in the analysis is *ret3*. Retention is a dichotomous variable representing the decision of an officer to stay or to leave the active duty in a determined period of time. The variable *ret3* assumes the value “1” whenever the officer remained on active duty for a period exceeding three years after his promotion to the rank of colonel, and “0” otherwise.

The three-year period was chosen for several reasons. According to the legislation that governs career flow in the FAB, the maximum period foreseeable for an officer to stay in the rank of O-6 is five years. Some exceptions can be applied, but they are not

important for the sake of policies' establishment. Normally the Board appreciates each cohort for the CPEA in the first year in the rank of O-6 in a way that the selected officers turn available for the course from the beginning of the subsequent academic year. Considering the course lasts for one year, any analysis for periods shorter than two years would be unfruitful. Usually colonels are judged and promoted in the fifth year; but in some cases, to cope with administrative needs, this process must be anticipated. The Brazilian Constitution dictates that it is for the President of the Republic the choice of colonels who will be promoted to the circle of general officers. Before the FAB submits the list of possible promotees, the colonels go through two screenings in the Air Force, the first in the Promotion Board and the second in the High Command. To foster a regular and balanced career flow, the administration tends to push one Cohort per year in the promotion process that normally occurs when the colonels complete the fifth year in the rank. In these situations, when the promotion processes begin in the Board, the results of the screenings leave, for some colonels, evidence that their promotion is unlikely and after some point impossible. Therefore, the attrition after four years in the rank is natural, even before completion the promotion process what makes the retirement mandatory. However, sometimes it is necessary to anticipate the processes of some cohorts to handle with internal needs. When it is the case, the attrition naturally begins in the third year. Therefore, to avoid the contamination of the results, this study considers retention as successful whenever the colonel remains in the rank for periods longer than three years, considering that some cohorts should be promoted to O-7 in the fourth year of O-6 and the promotion process begins within a few months of anticipation.

## **2. Explanatory Variables**

### **a. CPEA**

The variable of interest in this study is *cpea*. This variable is also dichotomous and assumes the value of “1” whenever the colonel is selected for the course and “0” in the contrary situation. The main objective of this study is to determine what influence the selection of a colonel for the CPEA carries in the retention's probabilities of this officer.

***b. List of Relative Merit***

The *Lista de Mérito Relativo* (LMR) is a list of officers belonging to the same cohort, sorted in a decreasing order of merit, whose calculations were made according to an internal methodology developed in the CPO. The LMR is the basic tool to quantify individual merit and the distinction of an officer compared to his peers, according to the Officers Assessment Manual edited by the CPO.

To sort officers in terms of merit, the Brazilian Air Force developed a methodology that attributes points to the results of performance appraisals, academic courses, physical evaluations, and disciplinary sanctions. Annually, the Promotion Board attributes points for the four factors above mentioned and applies a weighted average to each officer who ends up with a punctuation that could range from 0 to 1,500. After having been punctuated, the officers of the same cohort are sorted in a unique list (LMR) according to their relative merit. The punctuation in the LMR will be used in the regression models in the current study as a proxy of merit. So, the next explanatory variable to be controlled is *lmr\_points*.

***c. Performance Feedback***

All the colonels in the considered population received punctuation and were ranked in the LMR. However, only commanders or generals that need such information for decision-making processes access this list. Typically, this information is used by the Promotion Board itself to deal with decisions that refer to the selections for career courses or promotions.

As already mentioned in Chapter I, one of the objectives of performance appraisal is to provide constructive feedback to their officers in order to enable them, knowing their deficiencies, to work them out, in order to improve future performance. With this objective, the FAB began to inform the officers graduating from the cohort of 1982, about the group of merit that each officer was classified. Therefore, there are people in the dataset that received punctuation and were classified in the LMR, but never were informed about group of merit. These people will be used as a control group in this investigation.

In order to address the concerns of manpower adviser and investigate whether the induced perceptions fostered by the performance feedback were able to drain the power of the CPEA as an incentive for retention, the sample was divided in three groups to create interaction terms as showed below:

- Group 1—colonels classified in Group of Merit 1
- Group 2—colonels classified in Groups of Merit 2 or 3

The interaction terms were generated from the multiplication of *cpea* and groups mentioned above generating the follow interactions:

- *cpea\_group1*—variable that represents people that were selected to do the CPEA and were classified in Group 1.
- *cpea2\_group2*—variable that represents people that were selected to do the CPEA and were classified either in Groups 2 or 3.

The logit regression will interact the variables *cpea* and *group1* to check whether the interaction is significant and how much each explanatory variable impacts the dependent variable.

#### ***d. Specialties***

The last research question refers to Corps. As mentioned in Chapters I and II, the FAB has different necessities regarding the specialization of its general officers and, for this sake, knowing how different each Corps behaves helps to frame specific policies for each specialization.

Very similar to the interactions created in the prior section, interactions between selection for the CPEA and Corps were created, and the following interaction terms were generated:

- *cpea\_aviator*—variable that represents people selected to do the CPEA and belonging to the Corps of aviators.
- *cpea\_other\_corps*—variable that represents people selected to do the CPEA and belonging to the Corps other than aviator.

The logit regression will interact the variables *cpea* and *aviator* to check whether the interaction is significant and how much this relationship impacts the dependent variable.

*e. Demographic Variables*

Similar to this study, much research has been conducted to investigate questions related to attrition, retention, reenlistment, and so on. Basically, these studies applied to military environments try to predict the impact of a determined variable of interest in a personal decision to stay or leave the active duty. Usually studies control for demographic variables in their models. The legislation that governs career flow in the Brazilian Air Force is clear in stating that the internal processes to choose officers to career courses are eminently meritocratic, in such a way that demographic variables could be excluded from the model. However, if some kind of prejudice did exist in the processes then, failing to control for those demographic variable would be inducing biasedness in the interest variable estimator due to the omission of an important variable. Subsection 3 details the Omitted Variable Bias (OVB) problem.

According to Wooldridge (2009), while underspecifying the model can cause the OVB problem, overspecifying it would not generate biasedness in the estimators. In this sense, the demographic variables were included in the models.

Demographic variables include the following information:

(1) Age

The age was calculated in years at the day of promotion to the rank of O-6. The sample presented an average of 47.0 years old with a standard deviation of 2.74.

(2) Experience

The variable *exper* was included in the models and refers to years in the FAB as officers (possible period spent in civilian labor market or other Armed Forces were not considered). The sample was in average 28.38 years of experience at the time of promotion to the rank of colonel and the standard deviation was 2.31.

(3) Dependents

The number of dependents was also considered at the promotion to rank of colonel. The sample average was 2.12 dependents per person with a standard deviation of 1.22.

(4) Marital status

Table 3 depicts how the sample was distributed in terms of marital status. In the equation, however, only one binary variable was generated. The variable *married* assumed the value of “1” whether the officer were married and “0” otherwise.

(5) Religion

Table 3 shows how the sample was distributed in terms of religion. The variables *catholic*, *spiritualist*, *protestant*, and *other\_religion* were generated and assumed the value “1” whenever the colonel declared that faith and “0” otherwise. The variable *other\_religion* refers to the people that left the information missing, declared being atheist, agnostic or other religions that are minorities in Brazil such as Jewish, Muslims, Buddhists, and other. The variable *catholic* was left out of regressions to avoid perfect multicollinearity.

(6) Race

Table 3 depicts how the races were distributed over the sample. Nonetheless, only one binary variable was generated in the equations. The variable *white* assumed the value of “1” if the officer were white and “0” otherwise.

Table 3. Demographic Characteristics

Race		Marital Status		Religion	
White	79.83%	Married	86.29%	Catholic	70.08%
Brown	10.71%	Divorced	10.52%	Other_religion	14.10%
Other_race	8.01%	Single	2.22%	Spiritualist	9.36%
Black	1.45%	Widower	0.97%	Protestant	6.47%

Lastly, this research purposely did not control for gender and education attainment that some other studies proved important in determining the decision to leave the military. It is important to notice that in this specific population, these two variables

were very uniform since the graduation education is prerequisite for reach the rank of colonel and, in the considered cohorts, females did not exist yet.

### 3. Omitted Variable Bias

As it was already stated, the selection for the CPEA, in accordance with FAB's legislation, is done by an internal and meritocratic process, therefore it would be necessary to control for merit in order to extract the biasedness from the estimator  $\beta_l$ .

According Wooldridge (2009), when the equation leaves out an important variable, usually incurs in the problem of underspecification model, also known as omitted variable bias.

For example, consider the following equation:

$$y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \mu$$

where due to the absence of information  $x_2$ , build up the equation below underspecified:

$$\tilde{y} = \tilde{\beta}_0 + \tilde{\beta}_1 x_1$$

Note that the “til” was purposely placed in the estimators to establish that they belong to the underspecified equation.

The development of the equation ends up with the following conclusion, according to Wooldridge (2009):

$$Bias(\tilde{\beta}_1) = E(\tilde{\beta}_1) - \beta_1 = \beta_2 \tilde{\delta}_1$$

In this way,  $\tilde{\beta}_1$  will not be biased either if  $\beta_2$  or  $\tilde{\delta}_1$  were equal to zero, that is, in order to the coefficient of  $x_1$  will not be biased either if the effect of  $x_2$  over  $y$  should be null or if the correlation between  $x_1$  and  $x_2$  should be nonexistent.

In the specific case of this research, our main objective is to discover what influence the selection to the CPEA has on the attrition of a colonel.

Thus, we could define the equation below to deal with the research question:

$$\text{ret3} = \beta_0 + \beta_1 \text{cpea} + \varepsilon$$

To be sure that the estimator over *cpea* ( $\beta_1$ ) is not biased, one must certify that no variable correlated with CPEA that is also able to influence retention was left on the error term of the equation. To avoid the biasedness in the estimators, all the equations control for merit (*lmr\_points*); once, according to the legislation, the CPEA selection process is meritocratic. Furthermore, the information about demographic variables that the institution stores are also controlled to avoid eventual prejudices interfere the estimators.

## B. MODELS SPECIFICATION

Retention is a dichotomous variable that assumes the value of “1” whenever it succeeds and “0” when it fails. To estimate the probability of success of the event this study will use logit regressions, defined as:

$$\phi(y) = \frac{1}{1+e^{-[G(x)]}} \quad (2)$$

where  $\phi(y)$  is the probability of “y” succeed given a set of x’s.

As stated in the previous section, “y” was defined as *ret3*, which means it succeeds whenever the colonel remained in the active duty for a period superior to three years in the rank of O-6. Basically three equations ( $G(x)$ ) were developed to be plugged into Equation 2 and address the research questions and hypothesis stated in the previous chapters.

### 1. Effect of the CPEA on Retention

Equation 3 aims to verify the effect of the CPEA on retention.

$$G(x) = \beta_0 + \beta_1 \text{cpea} + \beta_2 \text{lmr\_points} + \beta_3 \text{age} + \beta_4 \text{exper} + \beta_5 \text{married} + \beta_6 \text{dependents} + \beta_7 \text{white} + \beta_8 \text{other\_religion} + \beta_9 \text{protestant} + \beta_{10} \text{spiritualist} + \mu \quad (3)$$

Since  $G(x)$  is not a linear function of  $y$ , but obeys Equation 2, the  $\beta_1$  does not give the a straightforward interpretation of effects of the *cpea* on  $y$ , so after verifying whether  $\beta_1$  is statistically significant, I determine the marginal effect of the *cpea* on



retention differentiating Equation 2 with respect to  $x$ . The  $\frac{\partial y}{\partial x}$  gives the marginal effect of each variable on  $y$ .

## 2. Different Effects of the CPEA on Retention Regarding Groups of Merit

Equation 4 deals with interaction terms between *cpea* and group of merit to determine whether belonging to Group of Merit 1 has a different effect on retention with respect to *cpea*.

$$G(x) = \beta_0 + \beta_1 \text{cpea\_group1} + \beta_2 \text{cpea\_groups2\&3} + \beta_3 \text{cpea} + \beta_4 \text{group1} + \beta_5 \text{groups2\&3} + \beta_6 \text{lmr\_points} + \beta_7 \text{age} + \beta_8 \text{exper} + \beta_9 \text{married} + \beta_{10} \text{dependents} + \beta_{11} \text{white} + \beta_{12} \text{other\_religion} + \beta_{13} \text{protestant} + \beta_{14} \text{spiritualist} + \mu \quad (4)$$

After testing the statistical significance of  $\beta_1$ , I use Equations 2 and 4 to predict the likelihood of a white, married, catholic, 47 years old and with 28 years of experience with two dependents (the most probable case) to be retained after a three-year period. To verify the interaction term, I consider that he was qualified for the CPEA, in two different scenarios: (a) belonging to Group of Merit 1; and (b) **not** belonging to Group of Merit I.

## 3. Different Effects of the CPEA on Retention Regarding Specializations

Finally, Equation 5 aims to check whether the effect of *cpea* is different for aviators, in order to specifically address the hypothesis stated for research question number 3.

$$G(x) = \beta_0 + \beta_1 \text{cpea\_aviator} + \beta_2 \text{cpea} + \beta_3 \text{aviator} + \beta_4 \text{lmr\_points} + \beta_5 \text{age} + \beta_6 \text{exper} + \beta_7 \text{dependents} + \beta_8 \text{married} + \beta_9 \text{white} + \beta_{10} \text{other\_religion} + \beta_{11} \text{protestant} + \beta_{12} \text{spiritualist} + \mu \quad (5)$$

In this last equation I checked for the statistical significance and direction of the interaction term (*cpea\_aviator*). In this case, the colonel will also be considered selected

for the CPEA under the following two specific scenarios: (a) being an aviator, and (b) **not** being an aviator.

## IV. RESULTS

### A. INTRODUCTION

This chapter presents the results for the various logistic regressions specified in the previous chapter. Section B is divided into three subsections to address each of the three research questions formulated in the first chapter of this study. Data collected from the Brazilian Air Force manpower databanks was used to verify whether there was statistical evidence to support the hypotheses developed regarding the CPEA selection process.

The first question addresses the effect that selection of a colonel for the CPEA has on retention within the military. The second research question addresses the concerns of FAB manpower advisers that suspect the classification of colonels in different classes in terms of relative merit could be influencing the retirement decisions of the involved colonels. And finally, the third question examines whether CPEA selection has a different effect on retention by corps group. Knowing how different Corps respond to the same incentive (i.e., CPEA) will be useful, since the Air Force has the flexibility to establish different policies for different Corps.

### B. RESEARCH QUESTIONS AND RESULTS

#### 1. RQ-1: What is the Effect of Being Selected for the CPEA on Retention?

As previous studies suggest, the use of incentives has the potential to enhance positive outcomes, such as increase retention, for organizations. Although, the predicted response to incentives is not obvious, especially when considering NMIs, there are a series of nuances to be considered. However, the overall use of NMIs is expected to produce positive results, mainly for senior employees after their basic needs are satisfied. In this sense the first hypothesis proposed was **the selection for the CPEA will increase retention rates.**

To check the validity of this hypothesis and, more important, to estimate the extent of the effect of this incentive in terms of retention, the following logit regression was estimated using the FAB sample:

$$\text{ret3} = \beta_0 + \beta_1 \text{cpea} + \beta_2 \text{lmr\_points} + \beta_3 \text{age} + \beta_4 \text{exper} + \beta_5 \text{married} + \beta_6 \text{dependents} + \beta_7 \text{white} + \beta_8 \text{other\_religion} + \beta_9 \text{protestant} + \beta_{10} \text{spiritualist} + \mu \quad (3)$$

where the coefficient of interest is on the variable *cpea*. Table 4 presents the predicted odds ratio for each of the independent variables in Equation 3.

Table 4. Odds Ratio of CPEA after Logit

variable	Odds Ratio	Std. Err.	z	P>z	[95% C.I.]	
cpea	13.3276	2.520025	13.70	0.000	9.200345	19.30633
lmr_points	1.000151	.0009399	0.16	0.872	.9983108	1.001995
age	.9908515	.0290248	-0.31	0.754	.9355661	1.049404
exper	1.017808	.0358458	0.50	0.616	.949921	1.090546
dependents	1.237625	.0829984	3.18	0.001	1.085189	1.411474
married	1.968938	1.070783	1.25	0.213	.6781357	5.716728
white	1.506182	.289472	2.13	0.033	1.033441	2.195175
other_religion	1.525626	.4970242	1.30	0.195	.8056392	2.889055
protestant	1.676758	.4779526	1.81	0.070	.9590456	2.93158
_cons	.0957463	.1954748	-1.15	0.251	.0017511	5.235127

The regressions presented a predicted value of “y” for someone placed in X (middle of the curve) of 0.67187909. This implies that the predicted retention rate for an average colonel is 67%. This value is reasonable, given that the actual retention rate is 64.77%. Of particular interest is the coefficient on CPEA. After controlling for variables listed above, the odds ratio of being selected for the CPEA is 13.33 (statistically significant at the 1% level). It means that those selected for the CPEA are 13 times more likely to remain on active duty, holding all the other factors constant. Other two variables

also presented statistical significance (white and protestant)<sup>4</sup> but with more modest odds ratios.

As expected, the estimated magnitude effect of being selected for the CPEA was large with a high level of statistical significance. Perfectly aligned with the studies reviewed in Chapter II, the NMIs are expected to enhance desirable outcomes for the organizations, mainly for senior employees who develop more complex tasks, and this is the specific case of the population on the scope.

## 2. **RQ-2: Is the Effect of CPEA Different for Colonels Classified in Different Groups of Merit?**

The second research question was proposed to verify the claim of manpower planners. They observe that even if selected for the CPEA, colonels present a significant attrition ratio and that it is reasonable to believe that the performance feedback provided by the performance appraisal system could be inducing perceptions and driving decisions about retirement.

In fact, the promotion to the generalship is quite restrictive. It means the proportion of people being selected to the circle of general officers is low and the choice could depend on a series of factors. It makes sense to believe the rank in the LMR should be highly considered in a meritocratic system. Since the number of vacancies for promotion does not cover all the people in highest group, this study checks the following hypothesis: **colonels belonging to Group 1 will respond better to the incentive (selection for the CPEA) compared to Group 2 and Group 3.**

Equation 4 presents the logit regression equation used to test the proposed hypothesis:

$$\text{ret3} = \beta_0 + \beta_1 \text{cpea\_group1} + \beta_2 \text{cpea\_groups2\&3} + \beta_3 \text{cpea} + \beta_4 \text{group1} + \beta_5 \text{groups2\&3} + \beta_6 \text{lmr\_points} + \beta_7 \text{age} + \beta_8 \text{exper} + \beta_9 \text{married} + \beta_{10} \text{dependents} + \beta_{11} \text{white} + \beta_{12} \text{other\_religion} + \beta_{13} \text{protestant} + \beta_{14} \text{catholic} + \mu \quad (4)$$

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<sup>4</sup> The software omitted the variable “catholic” due to the model perfectly predicting the outcome of interest for this group.

In this case the primary variables of interest will be *cpea\_group1* and *cpea\_groups2&3*. Both of these variables are interaction terms. The first (*cpea\_group1*) refers to the colonels that simultaneously were chosen to do the CPEA and were classified in first tier in terms of group of merit. The second variable, similarly, is the interaction of being selected for the course and, at the same time, belonging to Groups 2 or 3. The reference group is the group composed by colonels who were never classified in terms of group of merit and therefore never received this feedback.

The statistical significance of these interaction terms determines whether the effect of one variable depends on the presence of the other. And this is the specific case that I check in this section, that is, whether being selected for the CPEA is important if the colonel were classified in Group 1. However, it is important to note that the partial effect that *cpea* has on retention for Group 1 is not solely the coefficient on the interaction term.

Table 5 shows the odds ratio of each variable controlled in Equation 4 after logit regressions. As one can see, the interaction of CPEA and Group 1 has a statistically significant odds ratio, which suggests that one factor is important the presence of the other, regarding retention probabilities. In the other side, the interaction of CPEA and Groups 2 and 3 is statistically insignificant.

Table 5. Odds Ratio of Interactions of CPEA and Groups of Merit

ret3	Odds Ratio	Std. Err.	z	P>z	[95% C.I.]	
cpea	2.674778	.2799409	9.55	0.000	2.126104	3.223452
group1	-1.560156	1.079827	-1.44	0.149	-3.676578	.5562656
cpea#group1	2.192419	1.106616	1.98	0.048	.0234905	4.361347
groups2&3	.4172133	.3269321	1.28	0.202	-.2235619	1.057988
cpea#groups2&3	-.2750609	.4299104	-0.64	0.522	-1.11767	.5675481
lmr_points	-.0005877	.0011431	-0.51	0.607	-.0028281	.0016528
age	-.0103102	.0301987	-0.34	0.733	-.0694986	.0488781
exper	.0080566	.0359113	0.22	0.822	-.0623283	.0784415
dependents	.2058637	.0670524	3.07	0.002	.0744434	.3372839
married	.5524068	.5407187	1.02	0.307	-.5073824	1.612196
white	.4004281	.1920088	2.09	0.037	.0240978	.7767583
other_religion	.3968271	.3281897	1.21	0.227	-.246413	1.040067
protestant	.5244942	.2877059	1.82	0.068	-.039399	1.088387
_cons	-1.222046	2.251237	-0.54	0.587	-5.63439	3.190298

*a. Hypothesis Testing*

To verify whether the effect of CPEA on retention is greater for those in Group 1 than Group 2&3, the following hypothesis was statistically tested.

$$H_0: \beta_1 + \beta_3 = \beta_2 + \beta_3$$

$$H_a: \beta_1 + \beta_3 > \beta_2 + \beta_3$$

which simplifies to:

$$H_0: \beta_1 = \beta_2$$

$$H_a: \beta_1 > \beta_2$$

and can be rewritten as the following:

$$H_0: \beta_1 - \beta_2 = 0$$

$$H_a: \beta_1 - \beta_2 > 0$$

The calculations showed that the z score of  $(\beta_1 - \beta_2)$  is 2.09.

Therefore it is possible to reject the null hypothesis and affirm (at 5% level of statistical significance) that the effect of belonging to Group 1 with respect to the CPEA is higher than the other two groups in fostering retention.

In other words, the results shows that, even though the selection for the CPEA is an important factor to foster retention for all groups, the effect of this NMI on colonels belonging to Group 1 is higher than the effect of the incentive for the military belonging to the other two groups.

The result directly addresses the question of manpower planners. Ultimately they wonder whether the attrition is a response for a non-selection for the CPEA or a response to not being well classified in terms of Relative Merit. Actually, the regressions showed that both factors play a role in retention. The interaction between *cpea* and *group1* does exist and belonging to Group 1 enhances the effect of CPEA on retention.

Appendix B shows the marginal effect of CPEA for each one of the three groups calculated separately and the respective standard errors. In the appendix, to hold the *ceteris paribus* condition, the marginal effects for the three groups were calculated for a white, Catholic, married, 47 years old, with two dependents and 28 years of experience in the military, which is the most expected profile of a colonel. For this profile of colonel, the predicted probability of “y” is 86.71% if the officer is classified in Group 1 and 82.64% if classified in the other two groups.

### **3. RQ-3: Does the Effect of Being Selected for the CPEA Differ across Corps?**

The last research question to be investigated in this study refers to possible differences that groups (different Corps) may present in response to a determined



incentive. According to the theory reviewed in Chapter II, the incentives are supposed to enhance positive organizational outcomes, but the response may vary across different classes of individuals, mainly when the opportunity costs are different for those classes.

In the specific case of the Brazilian Air Force, decision-makers are required to establish policies regarding the selection for the CPEA, and these policies can and should be different for each Corps. Policymakers take actions to address the needs of the institution, and these needs are remarkably different as one can see in Table 2 presented in the previous chapter. The authorized billets for officers in the FAB shows that 64 out of 85 functions for general officers are reserved for aviators. Based on that disproportionality that makes the opportunity cost for aviators higher than for the other Corps, this study tests the hypothesis that aviators would respond better to the incentive in comparison to their peers. To check this hypothesis the following equation was specified:

$$\begin{aligned} \text{ret3} = & \beta_0 + \beta_1 \text{cpea\_aviators} + \beta_2 \text{cpea} + \beta_3 \text{aviator} + \beta_4 \text{lmr\_points} \\ & + \beta_5 \text{age} + \beta_6 \text{exper} + \beta_7 \text{married} + \beta_8 \text{dependents} + \beta_9 \text{white} + \beta_{10} \text{other\_religion} \\ & + \beta_{11} \text{protestant} + \beta_{12} \text{spiritualist} + \mu \end{aligned} \quad (5)$$

In the previous subsection (B-2), to compare two groups that received performance feedback, I used a group of colonels that never received that feedback as a reference group. But this is not the case in this subsection. To compare the two interaction terms (*cpea\_aviator* and *cpea\_nonaviator*), one of them (*cpea\_nonaviator*) was omitted and the coefficient of the remaining was interpreted in relation to the omitted one. The coefficient of interest though is  $\beta_1$ , which represents the interaction term of being an aviator and being selected for the CPEA. The odds ratio of the interaction term showed in Table 6 refers to the ratio of success of *cpea\_aviator* in relation to *cpea\_nonaviator*.

Table 6. Odds Ratio of Interactions of CPEA and Corps

ret3	Odds Ratio	Std. Err.	z	P>z	[95% C.I.]	
cpea_aviator	2.046969	.7279588	2.01	0.044	1.019531	4.109813
cpea	9.338373	2.414457	8.64	0.000	5.625889	15.5007
aviator	.4378837	.150007	-2.41	0.016	.2237487	.8569532
lmr_points	1.000102	.0009453	0.11	0.914	.998251	1.001956
age	.9518129	.0389411	-1.21	0.227	.8784696	1.03128
exper	1.007732	.0352652	0.22	0.826	.9409308	1.079276
dependents	1.232654	.083028	3.11	0.002	1.080207	1.406617
married	1.860489	1.017545	1.14	0.256	.6369206	5.434618
white	1.470476	.2846323	1.99	0.046	1.006226	2.148922
other_religion	1.504407	.4920951	1.25	0.212	.7923832	.856245
protestant	1.675062	.4815474	1.79	0.073	.9535146	2.942623
_cons	1.397877	3.680599	0.13	0.899	.0080216	243.5989

It is important to remember, once again, that to interpret the interaction term, this ratio cannot be considered separately from the other factors of the interaction. However, it is possible to notice the term is statistically significant and greater than one, which confirms the hypothesis that the interaction between being an aviator and selected for the CPEA does exist and aviators respond better to the incentive (CPEA) than non-aviators.

*a. Hypothesis testing*

In the case of this interaction, the hypothesis testing is simple and straightforward. It refers only to check if the coefficient of the interaction term ( $\beta_1$ ) is statistically significant.

Ho:  $\beta_1 = 0$

Ha:  $\beta_1 > 0$

$\beta_1$  presented a value of 0.7163601 with a standard error of 0.3556277 , what generated a z-score of  $\beta_1/SE(\beta_1) = 2.01$  , which permits to reject the null hypothesis and at 5% statistical significance states the effect of being an aviator with respect to the CPEA is greater than other Corps jointly, regarding the retention probabilities.

Similar to what this study found regarding different groups of merit in the previous section, the effect of selection for the CPEA overall is relevant for all Corps. The regression also confirmed that an interaction between being an aviator and being selected for the CPEA does exist. It means that effect of the CPEA is important to foster retention in the different Corps, but it's more effective for aviators. The result confirmed the hypothesis and did not cause any surprise, since, as far the evidence suggested, different classes of people are supposed to respond differently for a determined incentive and moreover the opportunity costs are expected to play a role in this interaction. As seen, the chances of promotion for aviators are remarkably higher in comparison to the other specialties what justifies that better response to the incentive.

Appendix C shows the effect of CPEA for each one of the four specialties calculated separately. The regression for infantry was omitted, since the number of observations was not enough to provide statistical results. Similarly to what was done in Appendix B, the regressions for the different Corps was run considering a white, catholic, married, 47 years old, two dependents and with an experience of 28 years old in the Air Force, holding the *ceteris paribus* condition. The predicted probability of retention for a period superior to three years in the rank of colonel is 92.94% for the aviators and 82.88% for the other Corps.

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## **V. CONCLUSION**

### **A. SUMMARY**

This research investigated the effect a career course (CPEA), defined in law as prerequisite for promotions to the ranks of generalship, exerts in retention of Brazilian Air Force colonels. It also searched to address the concerns of manpower planners who suspect the attrition rates of colonels could be the result of perceptions induced by the information provided by the Air Force as a title of performance feedback. And last, it checked whether colonels from different specializations responded differently to the same incentive.

The study framed the problem over the Expectancy Theory and searched for characteristics of incentives to deal with the questions to be investigated. Two sources of data within the Brazilian Air Force were merged and analyzed using logit regressions and the discussion of the results are presented in the next section.

The main goal of the study was to support the Brazilian Air Force with evidence, extracted from the data already existing, helping decision-makers in establishing appropriate policies regarding the CPEA selection process. Also, the study aimed contribute to the literature in providing information about how senior officers respond to a nonmonetary incentive in that specific culture and provide an insight about how perceptions influence this dynamic (incentive-retention).

### **B. DISCUSSION**

#### **1. Instrumentality**

The first and most important question investigated in this research was the effect of the selection for the CPEA in retention of colonels. As we have seen the CPEA's selection is a merit-based process, which permitted me to frame it as an instrument for promotion. Indeed, throughout the years, some colonels had been cut from the course due to infrastructure limitations, and the criteria, according to internal regulations was merit. As we have seen, instrumentality refers to the belief that performance leads to the reward.

Since merit is just the reflex of the performance, and considering the CPEA is legally defined as a prerequisite for promotion, the non-selection for the course constitutes a break in instrumentality.

The logit regressions proved with a high level of statistical significance that the selection for the CPEA is extremely strong in fostering retention. Economic theories go in the same direction suggesting the incentives are expected to increase positive organizational outcomes and NMIs are especially effective when applied for senior employees responsible for more complex tasks, where colonels can easily be framed on. Actually, this research revealed that colonels selected for the CPEA are 13 times more likely to stay in active duty after three years in the rank. This result is not at all surprising because selection for the CPEA keeps the officer in the race for promotion and it is also a recognition, while not being selected for the course eliminates any chance of promotion and acts as a demotivator factor.

## **2. Expectancy**

The second point investigated refers to the concerns of manpower advisers, who suspect performance feedback provided by the system could be inadvertently inducing perceptions of promotions probability and therefore driving retirement decisions. The system used information about historical performance appraisals and delivered that information to the officers aiming to provide them conditions to improve future performance.

Expectancy refers to the belief that an increase in effort could lead to an increase in performance. It is possible that colonels (far advanced in their military career and very close to the judgment for the generalship promotion) doubt the possibility of improving their efforts to a certain level that could be effective in reverting an unfavorable situation in a very short period of time (normally three or four years).

Based on that reasoning, this study hypothesized that people not belonging to the best tier in terms of Group of Merit could have their expectancy broken and therefore should not respond as well to the incentive as their peers better classified in the LMR.

The regressions proved the existence of an interaction between the Group of Merit 1 (better ranked in terms of punctuation in List of Relative Merit) and CPEA. That means one factor is important in the presence of another. In other words, the effect of CPEA is higher for people classified in Group 1. Economic studies found evidence that responses to incentives are complex and can vary across different population classes. For classes one should understand people with similar characteristics. It is reasonable to frame people belonging to the same Group of Merit as a class, since after receiving the same feedback of professional performance, they should nurture a very similar perception about career success.

As Appendix B shows, the marginal effects of CPEA are slightly different across the three different tiers. This result addresses specifically the concerns of some manpower planners who wonder whether the decision to retire is driven by the LMR instead of the result of CPEA. This research, however, found that, even though the LMR plays a significant role, the result of CPEA is still strong.

### **3. Valence**

Valence refers to whether a determined reward matches a personal goal. Indeed, it is expected that a person would keep pursuing a determined reward if this reward meets his or her personal goals. Recent studies suggested that some people value different outcomes (other than promotion and salary raise) regarding their professional life, such work/life balance, recognition, and others.

To verify the hypothesis that some people did not value the promotion, I looked to the descriptive statistics and noticed that 12.75% of the colonels, even those selected for the CPEA and belonging to the Group of Merit 1, retired before completing three years in the rank of colonel. This means that even with good indications of promotion possibilities they prefer to retire, and this evidence fits the description of valence, which suggests individuals should value rewards differently. Economic studies also found evidence that individuals with similar characteristics should respond differently to the same incentive. As Coughlan et al. (2013) stated, “Individuals within a population class recognize that people in similar circumstances may still have different preferences” (p. 9), and

according to Visagie and Koekemoer (2014), “Although senior managers have general conceptualizations of what career success entails, they have unique personal meaning which they associate with their own career success” (p. 43).

#### **4. Other Issues Referring to Incentives**

This study also observed some other characteristics of incentives that go beyond the scope of expectancy theory. As studies pointed out, NMIs are effective as a part of a package reward but basic needs should be addressed first. As expected, this study shows that financial stability is very important in the decision to retire. Indeed, no single case of quitting in the rank of O-6 occurred in the nine cohorts analyzed, independent of the result of CPEA or classification in the LMR. Actually the quitting normally occurs in the beginning of the career.

One final important point to be mentioned refers to the response of Corps to the incentives. The Air Force has the flexibility to adopt different policies for different Corps in order to attend the institution’s needs. According to the theory, different classes should respond different to incentives and as Appendix C showed, each Corps presented different responses to the CPEA regarding retention.

Furthermore, as the study of Lakhani (1988) suggested, opportunity cost is important to consider when people face decisions about professional life. As expected, the aviators, who used to have better chances of promotion, presented a better response to the CPEA in relation to the other Corps.

#### **C. FUTURE STUDIES**

The current study used statistical analysis over data to provide useful information to manpower decision-makers in understanding behavior of colonels regarding their response to selection for the CPEA in terms of retention. The results of the econometric regressions provided useful information for manpower planners, but surely some other important questions can be addressed by future studies. As we have seen, data about gender were omitted. Women are gaining space in the Brazilian labor market and the same were observed in the Armed Forces. The first military women were recently



promoted to the rank of O-6 and are assuming important charges in the structure of the branches. Since no females were found in the records of the analyzed cohorts, future studies using similar methodology will be able to show the effect of gender on retention.

A similar situation can apply to the infantry. As it was mentioned, the function of brigadier infantry in the Air Force was created in 2008, and consequently this specific Corps is still in the transitioning phase to adapt the career flow. Future studies will be able to state with more precision how infantry responds to incentives in terms of retention.

Another point discussed in Chapter II refers to Expectancy Theory. In this study, I briefly presented the theory and assumed, based on the analysis of the data processed, the existence of the three links (expectancy, instrumentality, and valence). The direct interaction with people involved in the process, as made by De Oliveira et al. (2013) using surveys adapted to the scenario in focus, would bring better assessment of the strength of each link and could serve as model to predict retention as well.

During this study, I also noticed that the ascension to the rank of colonel is vastly different across specializations. Deeper investigations about the reasons why it occurs were not taken, since the effect of the CPEA over retention only makes sense when investigating colonels; as it was stated in Chapter I, the CPEA is destined for the colonels belonging to the Corps with access to generalship. Nonetheless, future studies addressing the reasons why some officers seems do not even care about the promotion to the rank of O-6 could be welcome for the Brazilian Air Force administration and could lead to alternative solutions to the problem of shortage of colonels.

One final point refers to opportunity cost. To offer a hypothesis regarding the response of different Corps, this study only considered the opportunities inside the institution (chances of promotion). Further studies could observe also the data from outside, such as unemployment rates and average salaries for each different profession in order to be more insightful in focusing a determined Corps.

#### **D. RECOMMENDATIONS**

The magnitude and statistical significance of the effect of the CPEA proved the NMI is extremely strong in promoting retention. This information can be very useful to manpower planners in optimizing the gaps of personnel when the number of colonels exceeds the number of vacancies. Once they know with higher precision the effect the CPEA has on retention, manpower planners can plug the numbers in formulas and determine the ideal number of colonels to be selected for the course in order to minimize the unfulfilled billets of colonels.

The reasoning above, however, works only if the number of colonels and the boundaries for selection surpass the ideal number of officers to be selected for the CPEA. In this situation, limiting the number of people selected for the CPEA would provoke a “desirable” attrition to fit the existing colonels in organizational pyramid. However, having a shortage of colonels, the Air Force should consider the possibility of postponing the selection process (and consequently the course) in an attempt to increase the average time in the rank of O-6. It is important to remember, though, that a change in policy probably leads to a change in behavior. It means that not having information about the CPEA selection process does not necessary guarantee that the people would overall keep in active duty for three or four more years. Based on the assumption that perception is able to drive decisions, chances are that colonels would try to observe other indicators to “measure” their probabilities of promotion.

The second finding of this study refers to the effect of performance feedback. As some manpower advisers suspected, it proved to play a role in the retirement decision. An alternative way to provide this feedback should be studied; informing the colonels what point they have room to improve, without highlighting what tier they belong to, may have a positive impact on retention.

The results this research achieved is generalizable. Many Armed Forces in the world use courses to qualify their officers and improve the human capital of the organizations. The effect of the selection for the courses certainly will vary depending on the criteria and culture of each institution, but ultimately qualifying an officer for a

course increases the value of that asset. Therefore, whenever the selection for any course is able to foster this perception, it is likely to improve positive organizational outcomes.

Finally, as mentioned by Visagie and Koekemoer (2014), recent studies have found (and it is also aligned with the definition of valence in the Vroom's Expectancy Theory) that some people are likely to pursue different objectives in their professional life, other than promotion. The functions associated with the rank of colonel are very diversified and can provide numerous different opportunities. To cope with the FAB structure, colonels can exercise functions of command, staff, planning, attaché, and so on; and as far the theory goes, different people would prefer to develop different activities (such as leadership, advisory, projects, or diplomacy). Matching the right people in the right place should improve intrinsic motivation and reflect in retention. Understanding the individual differences and correctly managing these different "tastes" could be a way to a successful talent management in this critical moment of the career, when the officer achieved the financial stability by reaching the criteria to retirement.

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## APPENDIX A

variable	dy/dx	Std. Err.	z	P>z	[95% C.I.]		X
cpea	.5692401	.03263	17.45	0.000	.505292	.633188	.743389
lmr_points	.0000333	.00021	0.16	0.872	-.000373	.000439	1269.25
age	-.0020261	.00646	-0.31	0.754	-.014682	.01063	47.0025
exper	.0038913	.00776	0.50	0.616	-.011325	.019107	28.3914
dependents	.0470004	.01474	3.19	0.001	.018103	.075897	2.13908
married	.1302728	.08814	1.48	0.139	-.042469	.303015	.021548
white	.0936724	.04526	2.07	0.038	.004962	.182382	.804114
other_religion	.0866324	.06145	1.41	0.159	-.033804	.207069	.064643
protestant	.104784	.05229	2.00	0.045	.0023	.207268	.095005
Number of obs = 1021 LR chi2(9) = 279.95 Prob > chi2 = 0.0000 Pseudo R2 = 0.2118							

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## APPENDIX B

	<i>Group1</i> (dy/dx)	<i>Group2</i> (dy/dx)	<i>Group3</i> (dy/dx)
<i>cpea</i>	0.850*** (0.0747)	0.720*** (0.0908)	0.509** (0.255)
<i>lmr_points</i>	0.000114 (0.00101)	-0.00144 (0.00165)	0.000419 (0.00065)
<i>age</i>	-0.0459** (0.0187)	-0.0066 (0.0158)	-0.00243 (0.00899)
<i>exper</i>	-0.0108 (0.0183)	0.0148 (0.019)	0.0246 (0.0369)
<i>dependents</i>	0.104 (0.064)	0.0294 (0.0342)	0.0113 (0.0224)
<i>married</i>		0.111 (0.125)	-0.00764 (0.0794)
<i>white</i>	-0.106 (0.0717)	0.0188 (0.0916)	0.0779 (0.128)
<i>other_religion</i>	0.0852 (0.0885)	0.0794 (0.0896)	-0.295 (0.362)
<i>protestant</i>	0.0904 (0.0704)	0.0756 (0.0912)	0.00851 (0.0503)
<i>N</i>	119	117	90

Standard Errors in parentheses

\*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ ;

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## APPENDIX C

	<i>Aviator</i> ( <i>dy/dx</i> )	<i>Engineer</i> ( <i>dy/dx</i> )	<i>Stewardship</i> ( <i>dy/dx</i> )	<i>Physician</i> ( <i>dy/dx</i> )
<i>cpea</i>	0.505*** (0.152)	0.416*** (0.136)	0.341** (0.136)	0.221 (0.281)
<i>lmr_points</i>	9.83E-05 (0.00011)	-0.00215** (0.00085)	0.000508 (0.00042)	-0.0016 (0.00147)
<i>age</i>	0.000936 (0.00593)	0.0232 (0.0279)	-0.0287 (0.0232)	0.0278 (0.0237)
<i>exper</i>	-0.00308 (0.00562)	-0.0923*** (0.0345)	-0.00601 (0.0102)	-0.114 (0.0738)
<i>dependents</i>	0.00746 (0.00764)	0.165** (0.0733)	0.0408 (0.0296)	0.086 (0.087)
<i>married</i>	0.107* (0.0557)		0.0164 (0.1)	
<i>white</i>	0.0699 (0.0515)	0.073 (0.184)	-0.016 (0.0435)	0.174 (0.205)
<i>other_religion</i>	0.0223 (0.0282)	-0.0747 (0.228)	0.0449 (0.053)	0.287 (0.84)
<i>protestant</i>	0.0263 (0.026)		0.0409 (0.0573)	0.630* (0.37)
<i>N</i>	613	81	240	64

Standard Errors in parentheses

\* $p > 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$

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